Supporting Information for:

Photothermally Enhanced Drug Delivery by Ultra-Small Multifunctional FeCo/Graphitic-Shell Nanocrystals

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Fluorescence Quenching of Doxorubicin on FeCo/GC

Fluorescence spectra of aqueous solutions containing 100 μM DOX, either attached to FeCo/GC or in free form, were collected. The spectra confirmed that DOX fluorescence was absorbed on the graphitic surface of FeCo/GC *via* π- π stacking (Figure S1). Fluorescence measurements were collected using a Fluorolog-3 fluorometer (Horiba Jobin-Yvon) with excitation at 480 nm and 2.8 nm slits.

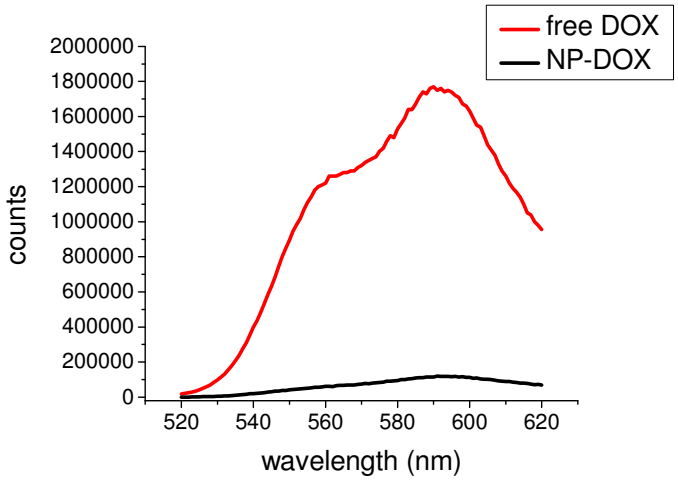

Figure S1. Fluorescence quenching of DOX on FeCo/GC. Fluorescence spectra of 100 μM solutions of free DOX or DOX on FeCo/GC. Free DOX has a peak ~14x higher than DOX loaded on FeCo/GC. The fluorescence quenching serves as confirmation of π-π stacking between aromatic DOX and the graphitic sidewall of FeCo/GC.

Toxicity Assessment of FeCo/GC

MCF-7 cells were incubated with FeCo/GC at varying concentrations for 2 days. Prior to viability assessment, cells were washed to remove FeCo/GC, and fresh cell medium was added. MTS assay was used to determine viability. The viability in Figure S3 is plotted as a percentage of untreated control cells. The concentrations in Figure S3 were chosen to match the FeCo/GC content in FeCo/GC-DOX samples used in Figure 1f. The FeCo/GC-DOX results are re-plotted in Figure S2 in FeCo/GC nanocrystal concentration for clarity. There is a clear decrease in viability of cells treated with FeCo/GC-DOX, while no drop in viability is observed for cells treated with FeCo/GC alone. This demonstrates that it is the DOX that is active in killing cells, not the FeCo/GC nanocrystal.

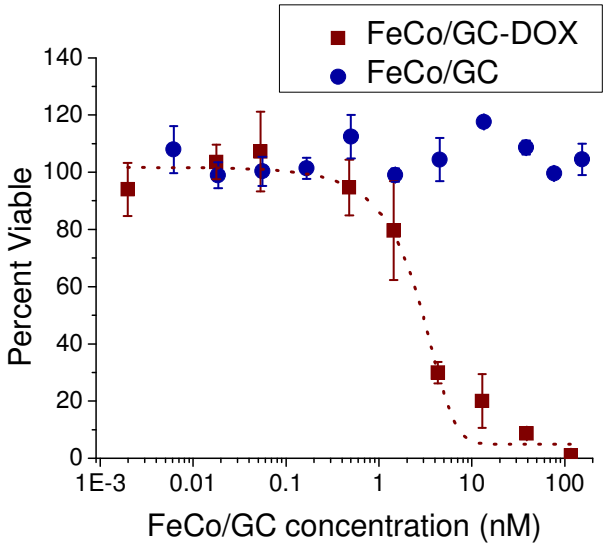

Figure S2. FeCo/GC Toxicity Assessment. Cell viability of MCF-7 cells incubated for two days with varying concentrations of FeCo/GC or FeCo/GC-DOX. The x-axis is the nanomolar FeCo/GC nanocrystal concentration.

Cellular Uptake of Free Doxorubicin

MCF-7 cells were incubated with 575 nM free DOX or PBS for 20 minutes at 37° C or 43° C. Cells were washed thoroughly and analyze by flow cytometry using a LSR II flow cytometer. While there appears to be slightly higher DOX fluorescence in the cells incubated at 43° C, the increase in uptake is marginal compared to the large difference in cellular uptake of FeCo/GC-DOX at 43° C over 37° C (Figure S2).

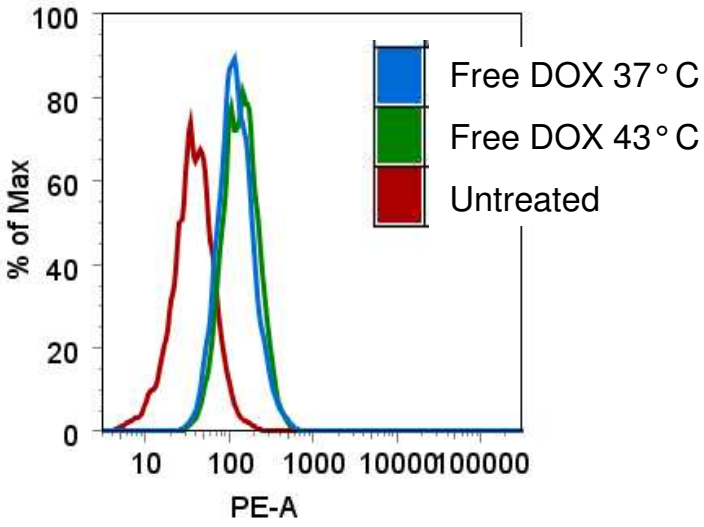

Figure S3. Flow Cytometry Analysis of Cellular Uptake of Free DOX. Cellular auto-fluorescence from untreated MCF-7 cells is shown in red. The blue and green curves show the fluorescent signal of cells incubated with 575 nM free DOX at 37° C or 43° C respectively.